

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problems Mailbox.**



(12) UK Patent (19) GB<sub>(11)</sub> 2 254 288 (13) B

(54) Title of Invention

Papermachine clothing

(51) INT CL<sup>5</sup>; B32B 3/24 5/08, D21F 1/00 7/08

(21) Application No  
**9206527.5**

(22) Date of filing  
**24.03.1992**

(30) Priority Data

(31) **9107166**

(32) **05.04.1991**

(33) **GB**

(43) Application published  
**07.10.1992**

(45) Patent published  
**30.11.1994**

(52) Domestic classification  
(Edition M)  
**B5N N0324 N0508 N175  
N177 N178 N18X N195 N196  
N207 N21Y N223 N225 N247  
N2740 N401 N402 N426  
N46X N480 N481 N483 N496  
N507 N509 N510 N53X N53Y  
N530 N531 N536 N537 N539  
N541 N543 N603 N62X N62Y  
N661 N666 N672 N70X N705  
N707 N708 N71Y N711 N713  
N728 N729 N764  
D2A AJA A502  
U1S S1659**

(72) Inventor(s)  
**Robert David Buchanan  
John Jeffery  
Ian Christison Sayers**

(73) Proprietor(s)  
**Scapa Group Plc**

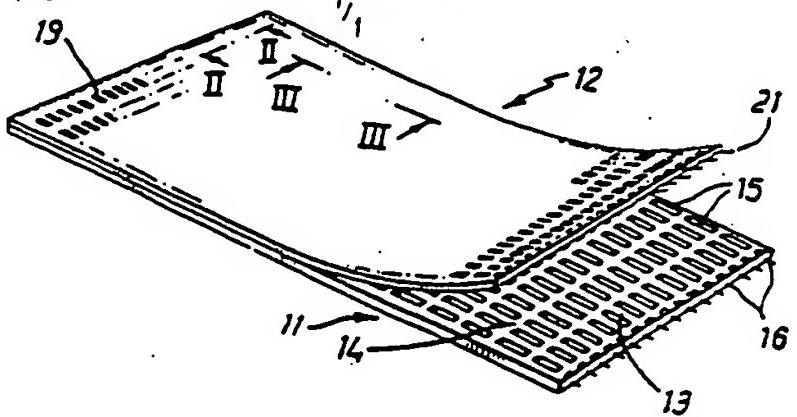
(Incorporated in the  
United Kingdom)

**Oakfield House  
93 Preston New Road  
Blackburn  
Lancashire  
BB2 6AY  
United Kingdom**

(74) Agent and/or  
Address for Service  
**Wilson Gunn McCaw & Co.  
41-51 Royal Exchange  
Cross Street  
Manchester  
M2 7BD  
United Kingdom**

SCAE F00 92-334147/41 = GB 2254288-E  
Nonwoven base fabric for paper-making felts - with combined mesh  
layers incorporating load bearing yarns

SCAPA GROUP PLC 91.04.05 91GB-007168  
P73 (F04) (84.11.30) \*GB 2254288-A B32B 3/24, 5/08, D21F 1/00  
7/08



(continued on next page)

**GB 2 254 288 B (continuation)**

**(56) Documents cited**

**GB2231838 A  
EP0307182 A1  
DE003444082 A1  
US4541895 A**

**(58) Field of search**

**As for published application  
2254288 A viz:  
UK CL(Edition K) B5N  
INT CL<sup>o</sup> B32B, D21F  
Online databases: WPI  
updated as appropriate**

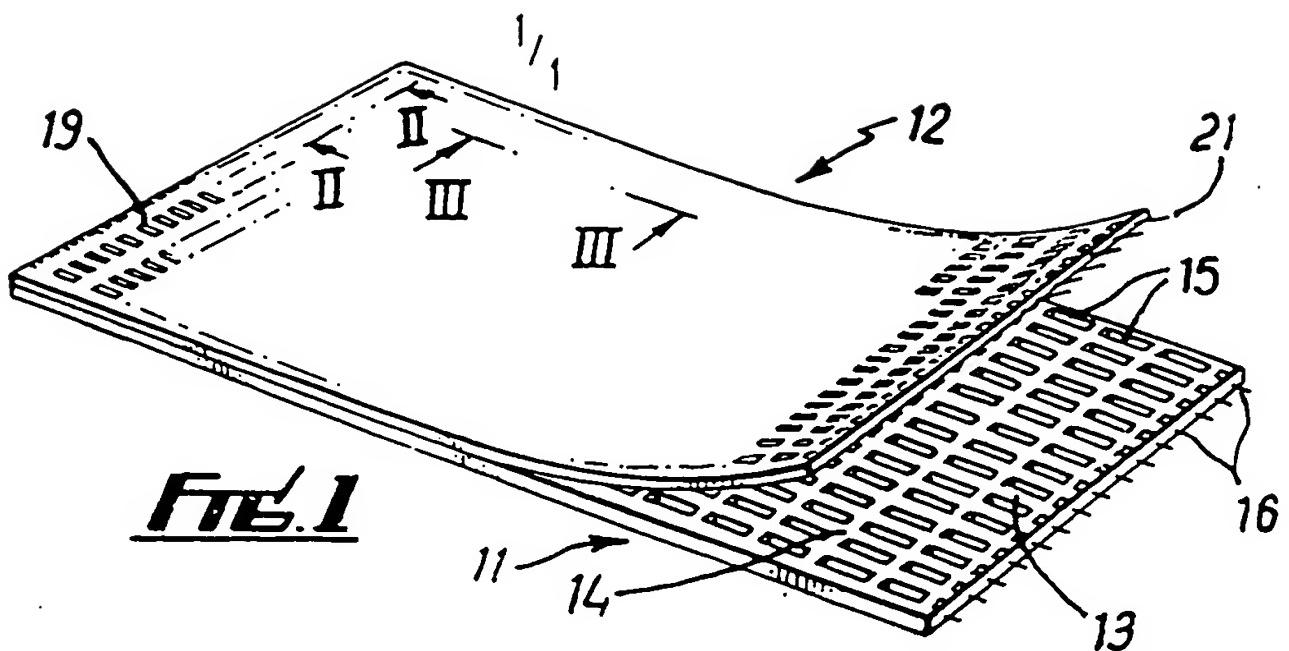


FIG. 1

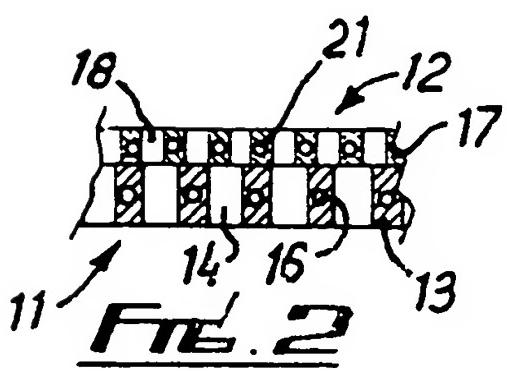


FIG. 2

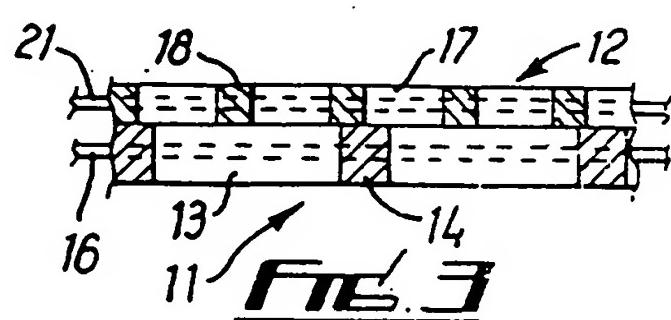


FIG. 3

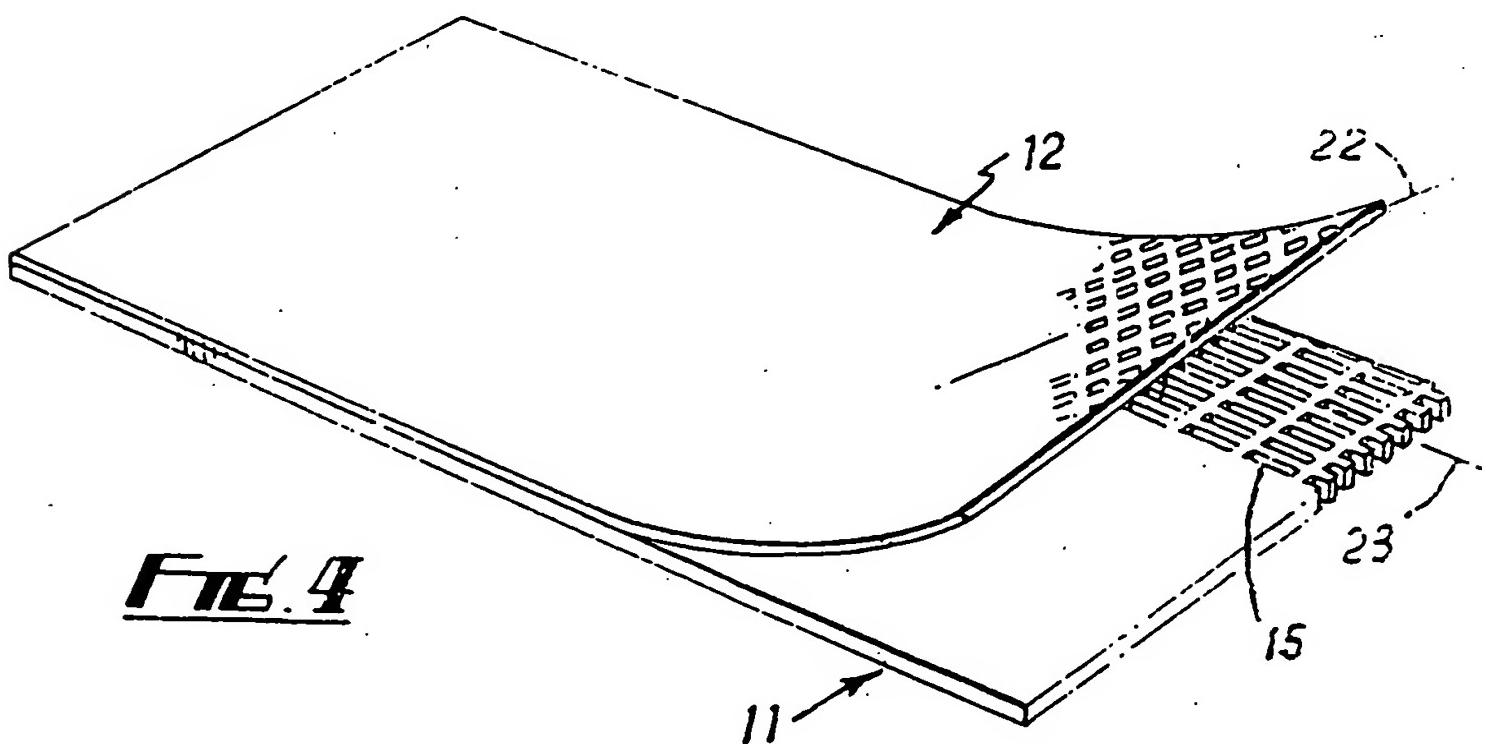


FIG. 4

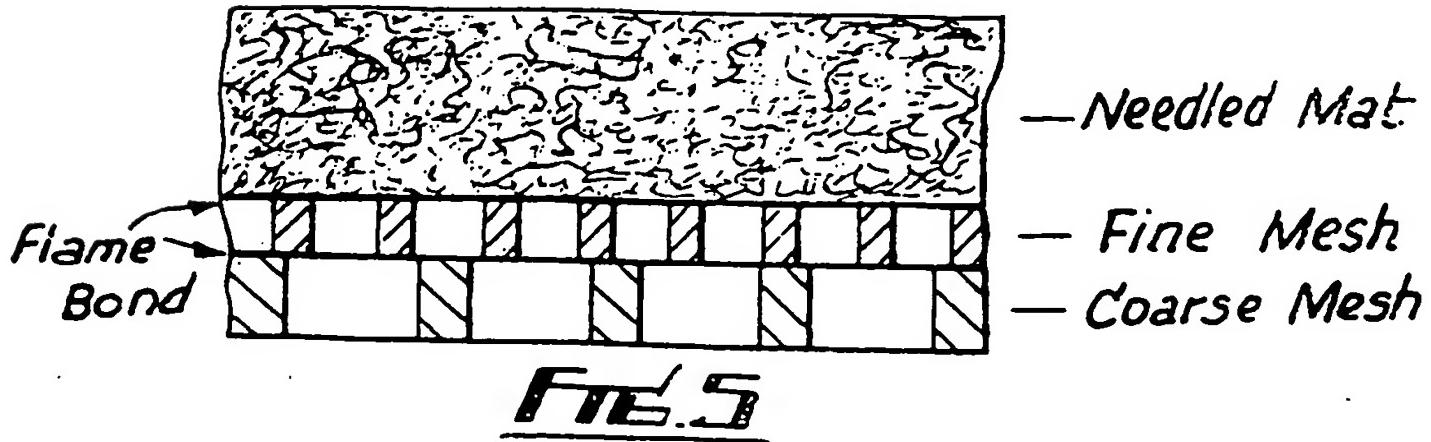


FIG. 5

-1-

PAPER MACHINE CLOTHING

The invention concerns papermachine clothing, and has particular, though by no means exclusive, reference to clothing for use in the press section of the papermaking machine.

Conventionally, press felts comprise a woven base cloth providing adequate strength in the running direction of the felt and one or more compressible layers applied thereto as, for example, by needling.

Base cloths of the conventional kind are expensive in manufacture and, furthermore, can give rise to the incidence of marking of the paper as it passes through the press section of the papermaking machine due to the presence of knuckles formed at the cross-over points of the warp and weft yarns which form the base cloth.

The primary object of the invention is to provide an alternative to the woven base cloth conventionally used in producing papermachine clothing which avoids at least in part, the disadvantages inherent in known structures.

According to the present invention there is proposed a non-woven base cloth for use in producing papermachine clothing, the said base cloth comprising plural superimposed layers of a synthetic

thermoplastics material provided in mesh form, characterised in that at least one of the mesh layers includes load bearing yarns provided wholly within lands extending in the intended running direction thereof.

Preferably the base cloth includes two layers each of respective and different mesh size.

The invention also includes a papermakers fabric comprising a base fabric as aforesaid in combination with a fibrous batt and/or a finely woven fabric at one face at least thereof and secured thereto.

The invention will now be described further, by way of example only, with reference to the accompanying drawings illustrating several embodiments thereof and in which : -

Fig. 1 is a diagrammatic perspective view of one form of base fabric constructed in accordance with the invention;

Figs. 2 and 3 are enlarged sections taken on lines II-II and III-III, respectively of Fig. 1;

Fig. 4 is a view corresponding to Fig. 1 and shows an alternative relative alignment of the mesh layers of the base fabric; and

Fig. 5 shows, in diagrammatic manner, a typical cross-section through a press felt incorporating the base fabric of the invention.

Referring now to the drawings, and particularly to Fig. 1 thereof, a base fabric for use in the production of a press felt for a papermaking machine comprises a first mesh layer 11 and a second mesh layer 12 secured together in superimposed disposition.

Mesh layer 11 presents longitudinally extending land areas 13 and transversely extending land areas 14, to give

rectangular mesh openings 15 of a first size, land areas 13 including yarns 16 to provide load bearing yarns in the intended running direction of the press felt.

Mesh layer 12 has longitudinally extending land areas 17 and transversely extending land areas 18, the mesh opening 19 also being of rectangular form but being of a second size less than that of the openings 15 of mesh layer 11.

Whilst, in the embodiment under consideration, longitudinal land areas 17 also include reinforcing yarns 21, the presence of such yarns is not essential.

Typically the mesh openings 15 of mesh layer 11 will measure 5mm x 1mm, whilst those of mesh layer 12 will measure 2mm x 0.5 mm, the two layers being 1.5 mm and 1.0 mm thick, respectively, and the upper layer serving to diffuse water present in the fabric and thereby reduce the incidence of shadow marking of the paper sheet. The apertures need not, of course, be of rectangular configuration, and the mesh layer having the larger apertures may lie above or below the other mesh layer as preferred.

The preferred material for the matrix of the mesh layers is thermoplastic polyurethane (typically that sold by B.F. Goodrich under reference 58810), whilst the reinforcing yarns of layers 11 and 12 may comprise any monofilament or multifilament yarn having good bonding characteristics in relation to the matrix material and physical characteristics appropriate to the context, and will typically be of 0.5 mm

and 0.2 mm diameter, respectively.

The mesh layers are conveniently manufactured in accordance with the method described and claimed in GB-A-2202873, although other methods may be preferred, such as, for example, a powder dispersal technique.

The two mesh layers will ordinarily be secured together by thermal fusion of the abutting surfaces in conventional manner. However, it may be preferred, in some instances to join the fabrics by means of an adhesive or by ultrasonic welding or by applying a batt of fibres to the superimposed layers and needling such fibres into and through the layers.

It may be found desirable to provide localised protruberances on the land areas at one or both of the adjacent surfaces of the two mesh layers, to ensure the presence of a fluid flow path in the event that a land area of one mesh layer overlies, and thereby masks, an aperture in the other mesh layer.

In a second embodiment, see now Fig. 4, the longitudinal axis 22 of the mesh openings 19 is inclined with respect to the corresponding axis 23 of openings 15 of mesh 11, the individual mesh layers being of like kind to those shown in Figs. 1 to 3. The preferred angle of inclination shown is 45° as shown, but other bias angles may be used if desired.

The base fabrics as shown in the drawings will be

6

provided with a fibrous batt of conventional form and materials. The batt may be subjected to pre-consolidation if desired, and is secured to the base fabric by thermal bonding, by an adhesive, ultrasonic welding or by needling. Ordinarily the fibres in the batt will be randomly orientated, but, in some circumstances length orientation may be preferred.

Alternatively, the batt may be built up in situ on the base fabric by means of a melt-blown technique wherein fibres are extruded onto the moving base fabric and, by virtue of their semi-molten state, adhere at their boundary surfaces to the base fabric and/or to any previously applied fibre layer. The degree of fineness of the fibres may be varied during batt build-up according to the specific requirements of the press felt. It is to be appreciated that spun laced, spun bonded or other non-woven web creating techniques may also be used to create the batt.

The press felt as above proposed is of open-ended form and the ends thereof may be joined, for example, by forming loops at the ends of the coarser mesh layer in accordance with the procedures proposed in GB-A-2231838, the loops being intended to receive a pintle wire on interdigitation of loops at the respective ends, the ends of the finer mesh layer being simply brought into abutment. The fibrous batt, whether previously formed or built-up in situ will extend across the line of join and, if necessary, can be

cut transversely of the press felt in register or offset disposition with respect to the line of join, as is proposed, for example, in GB-A-2231529.

It is to be appreciated, however, that the felt may be of endless form.

As the base fabric as hereinbefore described is devoid of knuckles at the mesh/batt interface, the weight of batt applied may be reduced as compared with that necessary to avoid the incidence of marking in the context of a fabric embodying a woven base.

However, there are circumstances wherein controlled marking is desirable, and in these circumstances the surface of the overlying mesh could be of ribbed configuration, as would be the case if the base fabric were to be embodied in a marking felt. In the case of a felt for use in the fibre/asbestos cement industry the overlying mesh would be formed with knuckles, (and if required ribs,) to provide localised pressure points to encourage bonding between the successive fibre cement layers.

Claims

1. A non-woven base cloth for use in producing papermachine clothing, the said base cloth comprising plural superimposed layers of a synthetic thermoplastics material provided in mesh form, characterised in that at least one of the mesh layers includes load bearing yarns provided wholly within lands extending in the intended running direction thereof.
2. A non-woven base cloth as claimed in claim 1, characterised in that said base cloth includes two layers each of respective and different mesh size.
3. A non-woven base cloth as claimed in claim 1 or claim 2, characterised in that each mesh layer includes load bearing yarns extending in the intended running direction thereof.
4. A non-woven base cloth as claimed in any one of the preceding claims, characterised in that the apertures in each mesh layer are of rectangular configuration.
5. A non-woven base cloth as claimed in any one of the preceding claims, characterised in that the apertures in one mesh layer define spaced parallel ribs extending in the intended running direction of the fabric, there being load bearing yarns encapsulated within said ribs.
6. A non-woven base cloth as claimed in claim 5,

including a superimposed mesh layer, characterised in that the apertures therein define spaced parallel ribs inclined with respect to the yarn carrying ribs of the said one mesh layer.

7. A non-woven base cloth as claimed in claim 6, characterised in that the ribs of the said one mesh layer and those of the said superimposed mesh layer are inclined at an angle of 45°.

8. A non-woven base cloth as claimed in any one of the preceding claims, characterised in that the cloth is of endless form.

9. A non-woven base cloth as claimed in any one of claims 1 to 7, characterised in that the cloth further includes loops at the respective ends thereof, the said loops being provided at the ends of a mesh layer having load bearing yarns.

10. A non-woven base cloth as claimed in any one of the preceding claims, characterised in that the mesh layers are secured together in superimposed disposition.

11. A non-woven base cloth as claimed in claim 10, characterised in that the cloth further includes a batt of fibres needled to the layers thereby to secure said layers together.

12. A non-woven base cloth as claimed in any one of the preceding claims, in combination with a fibrous mat secured thereto at one face thereof.

13. A non-woven base cloth as claimed in claim 12, characterised in that the surface of the mesh layer adjacent the fibrous mat is of profiled form.
14. A non-woven base cloth as claimed in claim 13, characterised in that the profiled form of the surface of the mesh layer adjacent the fibrous mat includes upstanding ribs.
15. A papermakers fabric characterised in that the fabric includes a base cloth as claimed in any one of the preceding claims.